

MALE SURFACE AREA TO VOLUME RATIO TRACKS AVERAGE TEMPERATURE IN PILL MILLIPEDES *SPHAEROTHERIUM* BRANDT, 1833.

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Abstract- The male surface area to volume ratio was correlated with the average temperature across the distribution of pill millipedes *Sphaerotherium* Brandt, 1833. There was a correlation between the male surface area to volume ratio with the average temperature across the distribution of pill millipedes *Sphaerotherium* (Spearman's $r=-0.76376262$, Z score= -1.95264152 , $n=7$, $p=0.02543097$).

Keywords: dimorphism, Pill Millipedes.

I. INTRODUCTION

Diplopoda are underrepresented in allometric analyses of SSD, although sexual differences are known in body mass, length, width and leg dimensions of over half the taxa studied [1-427]. Size differences occur with factors such as color, sexes, species, urbanisation and water relations. Diplopoda resemble the majority of invertebrates where SSD is reversed. SSD has consequences for the outcome of sexual encounters in diplopod mating. The macro-evolutionary patterns are being resolved in the class Diplopoda.

In the present study, a correlation between the male surface area to volume ratios with average temperature is performed across the distribution of pill millipedes *Sphaerotherium* Brandt, 1833.

II. MATERIALS AND METHODS

Male surface area was calculated at <https://www.omnicalculator.com/math/area-of-sphere> from the widths of seven millipede species (<https://www.entomoljournal.com/archives/2018/vol6issue1/PartI/5-6-352-508.pdf>) (Appendix 1 & 2). A correlation between the two factors (surface area and average temperature) was generated at <https://www.gigacalculator.com/calculators/correlation-coefficient-calculator.php>.

III. RESULTS

There was a correlation between the male surface area to volume ratio with the average temperature across the distribution of pill millipedes *Sphaerotherium* (Fig. 1: Spearman's $r=-0.76376262$, Z score= -1.95264152 , $n=7$, $p=0.02543097$).

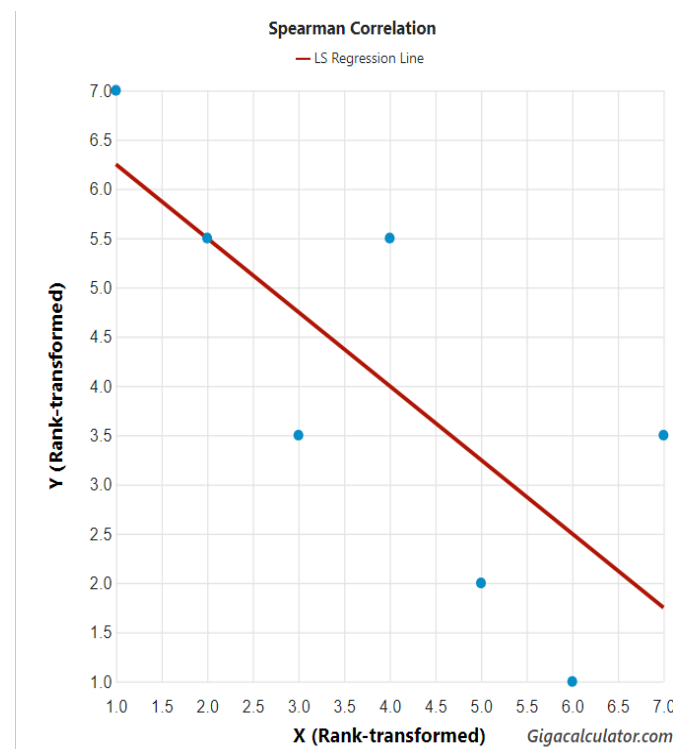


Fig. 1 A negative correlation between the male surface area to volume ratio with average temperature across the distribution of pill millipedes *Sphaerotherium*.

IV. DISCUSSION

The significant effect of weather on males and females in size are known in this genus. There is a negative correlation between the male surface area and average temperature. This is an addition to one of the many relationships of body size in pill millipedes.

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APPENDIX 1. The male surface area to volume ratios (1/mm) followed by average temperature in seven pill millipedes *Sphaerotherium* Brandt, 1833.

0.19355, 16.6
0.5, 15.7
0.27907, 16.4
0.25, 20.9
0.26087, 18.1
0.4286, 16.6
0.4444, 16.4